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PN - JP10104056 A 19980424

PD - 1998-04-24

PR - JP19960255985 19960927

OPD - 1996-09-27

TI - ACCELERATION SENSOR FOR [redacted] TYPE OPTICAL FIBER

IN - SHINDO YUGO; DOBASHI KOJI; KAMATA HIROSHI; SATOU RIYOUTAKU

PA - OKI ELECTRIC IND CO LTD

IC - G01H9/00 ; G01P15/03 ; G01V1/16

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TI - Acceleration sensor using optical fibre for detecting acceleration of [redacted] of stencil - has second optical coupler which combines light output by first and second intermediate optical fibres to form and output interference light

PR - JP19960255985 19960927

PN - JP3237056B2 B2 20011210 DW200203 G01H9/00 009pp

- JP10104056 A 19980424 DW199827 G01H9/00 009pp

PA - (OKID) OKI ELECTRIC IND CO LTD

IC - G01H9/00 ;G01P15/03 ;G01V1/16

AB - J10104056 The sensor has an input optical fibre (11) which guides the light, irradiated by a laser (1), to one end of a first optical coupler (2). A circular resonant panel (9) is attached to a [redacted] main body (7). A first intermediate optical fibre (3a), which is spirally formed on the resonant panel, sends the light from one end of the first optical coupler to one end of a second optical coupler (4).

- A second intermediate optical fibre (3b), which is [redacted] to the main body that does not deform when [redacted] is received from the resonant panel, sends the light from the other end of the first optical coupler to the other end of the second optical coupler. The light output by the first and second intermediate optical fibres are coupled by the second optical coupler which outputs a corresponding interference light.

- ADVANTAGE - Enables long-distance transmission of interference light. Offers long term reliability even when sensor is exposed to liquid, since electrical signal is not utilised.

- (Dwg.1/6)

OPD - 1996-09-27

AN - 1998-301086 [27]

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TI - ACCELERATION SENSOR FOR [redacted] TYPE OPTICAL FIBER

AB - PROBLEM TO BE SOLVED: To obtain the acceleration sensor which can obtain a long-term reliability by detecting the [redacted] acceleration even when the object of measurement is located in liquid.

- SOLUTION: This acceleration sensor includes the following parts. An input- side coupler 2 divides input measuring laser light into two light beams and outputs the beams. An optical fiber 3a is the optical fiber, which is mounted on a circular [redacted] plate 9, on which [redacted] is applied in the spiral state and outputs the input light from the optical coupler 2 to the optical fiber 4 . An optical fiber 3b is the optical fiber, which is [redacted] around the structure that is not deformed by the application of [redacted], and outputs the input light from the optical coupler 2. The output side optical coupler 4 combines the output light of the optical fibers 3a and 3b and outputs the interference light. The [redacted] type optical fiber acceleration sensor part having these parts is included.

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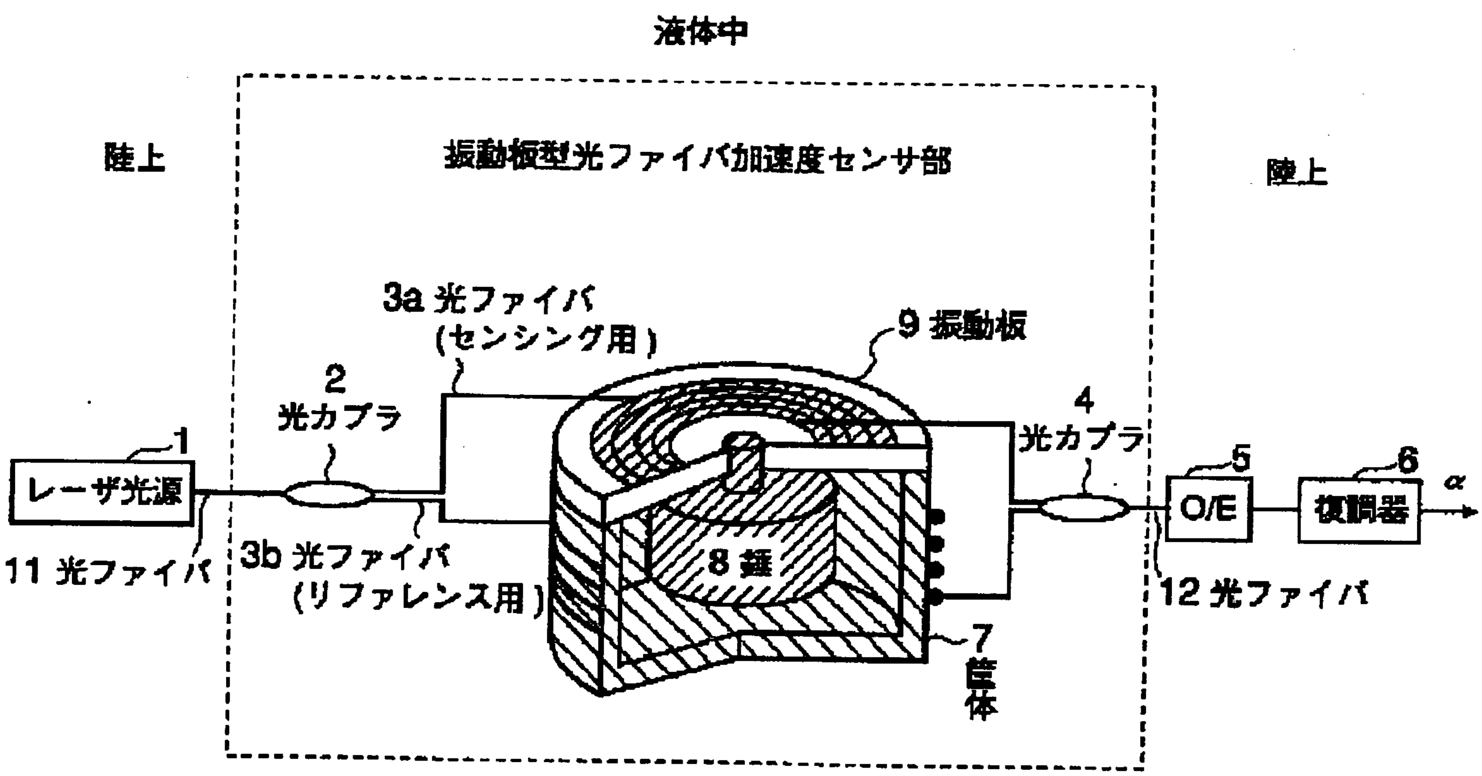
optical fiber 3a and reference optical fiber 3b is combined with the optical coupler 4, and an interference light is generated. That is, 2 bundle-of-rays interferometer is constituted here. After the interference light generated with the optical coupler 4 is outputted through an optical fiber 12 and changed into an electrical signal by the photoelectric transducer 5, the output signal to which it restored with the demodulator 6 is acquired. In addition, the diaphragm mold optical fiber acceleration sensor section of this invention is constituted by each component from an optical fiber 2 to an optical fiber 4.

[0010] Next, actuation of drawing 1 is explained. The diaphragm mold optical fiber acceleration sensor of drawing 1 constitutes the seismic system respectively corresponding to [case / 7] a spring in the elasticity of a basic yoke and the circular diaphragm 9. If the oscillation below a resonant frequency joins a diaphragm mold optical fiber acceleration sensor, a spindle 8 will vibrate to a case 7 and the circular diaphragm 9 will also carry out a crookedness oscillation according to it. At this time, the die length of sensing fiber 3a with which the circular diaphragm 9 is equipped also changes. On the other hand, the die length of reference fiber 3b with which the side face of a case 7 was equipped does not change. Therefore, it is phase contrast phi (t) between the laser beams which the difference of die length arose between two optical fibers of an interferometer by the acceleration of vibration alpha, and have spread two optical fibers. It is generated.

[0011] This phase contrast phi (t) Since the electrical signal which changed the interference light which the optical coupler 4 outputs through the photoelectric transducer 5 by the size of a value also changes, when a demodulator 6 carries out recovery processing of this electrical signal, it can ask for the acceleration of vibration alpha. In addition, in drawing 1 , although the example at the time of preparing reference optical fiber 3b in the side face of a case 7 was shown, as long as it is the structure part which does not deform with acceleration, except a side face is sufficient.

[0012] As mentioned above, since the diaphragm mold optical fiber acceleration sensor of the operation gestalt 1 detects an oscillation of the spindle of a seismic system as die-length change of an optical fiber, it can detect the acceleration of vibration, without using an electrical circuit for the acceleration-sensor section. Moreover, if an optical fiber is used also as a signal-transmission way, it will also become possible to install the electrical part of a laser light source 1 or photoelectric-transducer 5 grade ashore, to install the optical fiber acceleration sensor section from the optical coupler 2 to the optical coupler 4 into a liquid, and to apply. Therefore, long-term dependability is acquired also in the acceleration measurement in a liquid, and it doubles and has long-distance transmission of the interference light which it is as a result of measurement further, and an advantage on the system configuration of becoming possible.

[0013] Operation gestalt 2. drawing 2 is drawing showing the configuration of the diaphragm mold optical fiber individual-joint-acceleration sensor concerning the operation gestalt 2 of this invention, and 1, 2, 4-6 of this drawing, and 11 and 12 are the same as that of drawing 1 . 3a and 3b are measuring object objects, and an optical fiber and 7 are [a case and 8 / a spindle, and 9a and 9b / a circular diaphragm and 10] **. In addition, on these descriptions, optical fibers 3a and 3b are also called the 1st optical fiber and 2nd optical fiber, respectively. Moreover, the case 7 is being fixed to the measuring object object 10. The main points of difference with drawing 1 of drawing 2 are equipping one side by the side of the same (this example outside) of these circular diaphragms 9a and 9b of two sheets with the 1st and 2nd optical fiber 3a and 3b using the circular diaphragms 9a and 9b of two upper and lower sides,



本発明の実施形態1に係る振動板型光ファイバ加速度センサの構成を示す図